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(71) Applicant (for all designated States except US): **H. C. STARCK INC.** [US/US]; 45 Industrial Place, Newton, MA 02161-1951 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **AIMONE, Paul, R.** [US/US]; 20 Tanglewood Drive, Bridgewater, MA 02324-2275 (US). **GOLDBERG, Howard, V.** [US/US]; 34 Donna Road, Framingham, MA 017-7910 (US). **MALEN, Richard** [US/US]; 1 East Main Street, Ayer,

MA 01432-1605 (US). **MORSE, Thomas, A.** [US/US]; 71 Spear Street, Melrose, MA 02176-5615 (US). **KUMAR, Prabhat** [US/US]; 31 Pinewood Avenue, Framingham, MA 01701-7656 (US). **ULENHUT, Henning** [US/US]; 566 Franklin St., Apt. 3, Cambridge, MA 02319 (US).

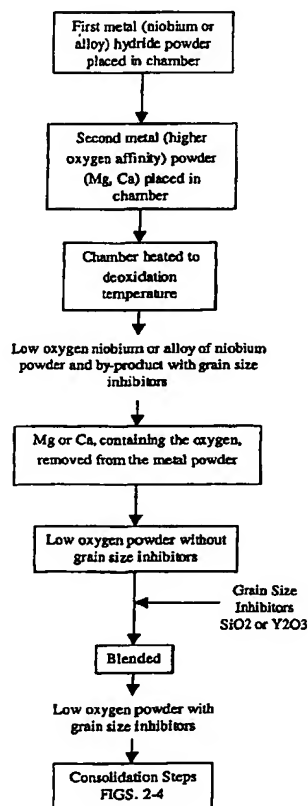
(74) Agent: **VAN EYL, Diderico**; Bayer Corporation, 100 Bayer Road, Pittsburgh, PA 15205-9741 (US).

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[Continued on next page]

(54) Title: STABILIZED GRAIN SIZE REFRACTORY METAL POWDER METALLURGY MILL PRODUCTS



(57) Abstract: A powder metal (P/M) mill product and the method of fabrication such product made out of low oxygen (<400 ppm) refractory metal, or alloys thereof, using oxide additive (such as MgO, SiO₂, and Y₂O₃) for co-fabrication to achieve refractory metal grain size stabilization as required in high temperature applications. One such product is a sheet with small grain size containing oxide particles as grain size stabilizers. The product has good mechanical properties, low oxygen content in refractory metal fiber derivatives of the powder within the mill product and if is available as large pieces of sheet (lateral dimensions). The metal powder is consolidated to a sheet bar by different methods, which may weigh 50 pounds or more.



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
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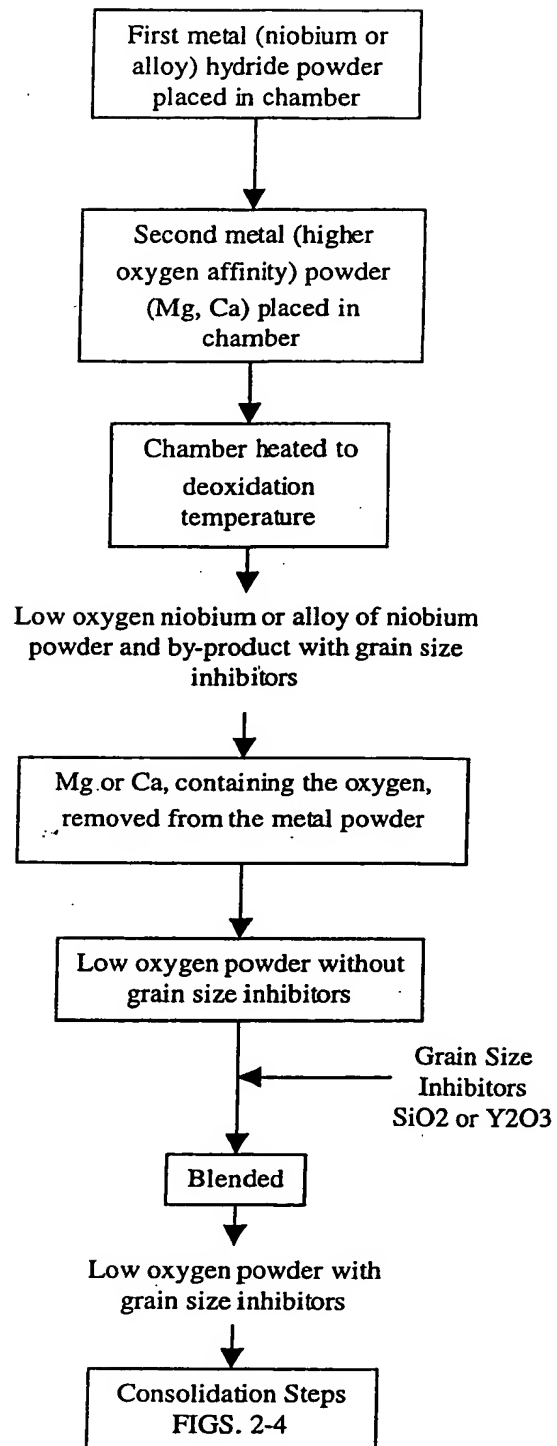


FIG. 1

Low oxygen powder with
grain size inhibitors

FIG 1

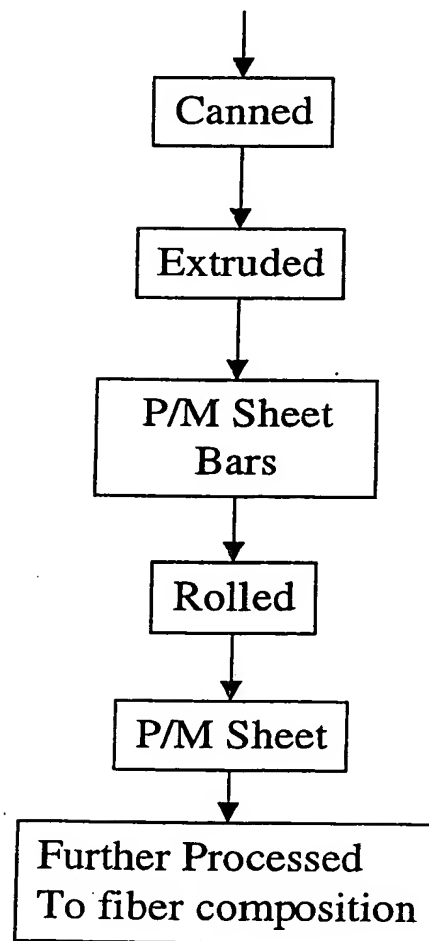


FIG. 2

Low oxygen powder with
grain size inhibitors

FIG 1

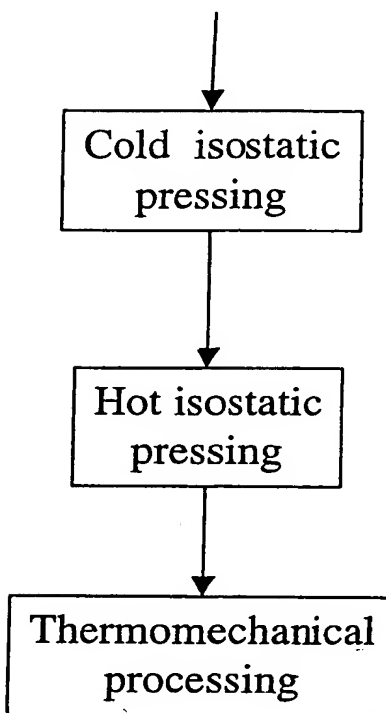


FIG. 3

Low oxygen powder
with grain size inhibitors

FIG 1

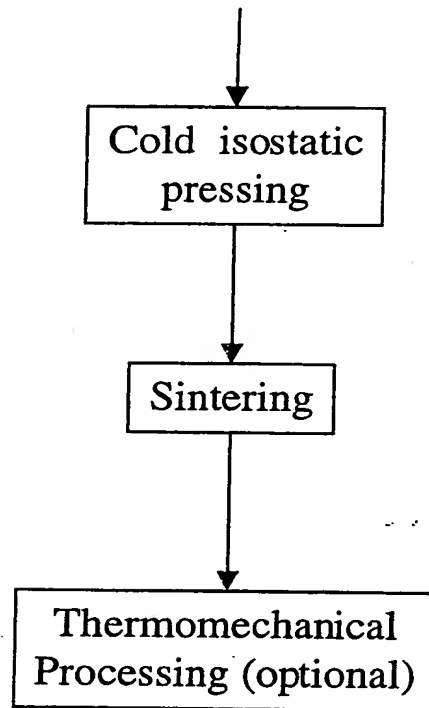


FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C22C32/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 261 337 B1 (KUMAR PRABHAT) 17 July 2001 (2001-07-17) cited in the application column 1, line 38 - line 41 column 3, line 13 - line 24; claims 1-10; example 1	1-24
A	R.F.CHENEY: "Sintering of refractory metals", METALS HANDBOOK, ASM, 9TH ED. VOL. 7, 1984, PAGES 389-393, METALS PARK, OHIO, US XP002245862 page 391, column 2, line 51 - line 60	1-24
A	US 4 950 327 A (ECK RALF ET AL) 21 August 1990 (1990-08-21) claims 1,2,7	1-24

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Schruers, H

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Information on patent family members

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